National Institute of Environmental Health Sciences

Airborne particulate matter (PM2.5) and the prevalence of allergic conjunctivitis in Japan

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Abstract:

Objective: Exposure to particulate matter less than 2.5. μm in diameter (PM2.5) is associated with asthma and respiratory symptoms, but little is known about the influence of PM2.5 on allergic conjunctivitis. The purpose of this study was to examine the association of PM2.5 with outpatient attendance for allergic conjunctivitis. Methods: We conducted a time-series analysis of the association between outpatient attendance for allergic conjunctivitis and PM2.5 levels from May to July (non-pollen season) and from August to October (the autumnal pollen season) in 2012. Air pollution data (including the levels of PM2.5, oxidants, nitric oxide, nitrogen dioxide, nitrogen oxide, carbon monoxide, methane, non-methane hydrocarbons, and total hydrocarbons) and data on the daily weather conditions (temperature, wind speed, and humidity) were collected at a centrally located monitoring station in Tokyo. We calculated weekly average values for the daily number of outpatient visits, as well as the air pollution and weather data, and used the weekly average values for analysis. Results: There was a significant association between the number of outpatient visits for allergic conjunctivitis and the PM2.5 level (r. Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.62, p. Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.0177) from May to July, while no correlation was found between the number of outpatient visits and any variable assessed from August to November. Multivariate analysis also showed that PM2.5 was a significant predictor of the number of outpatient visits from May to July (odds ratio. Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 9.05, p. Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.0463), while there were no significant predictors of the number of outpatient visits from August to October. From May to July, PM2.5 showed a negative correlation with humidity (r. Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) -. 0.53, p. Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.0499). Conclusions: These findings suggest a possible role of PM2.5 in the development of allergic conjunctivitis during the non-pollen season. This association between PM2.5 and allergic conjunctivitis may have broad public health implications in relation to allergic diseases.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Meteorological Factors, Temperature

Air Pollution: Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): nonmethane hydrocarbons ; total hydrocarbons

Temperature: Fluctuations

Geographic Feature: ☒

resource focuses on specific type of geography

Urban

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Japan

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Other Health Impact

Other Health Impact: allergic conjunctivitis

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified